

REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

The Abstract has been amended as required in the Office Action.

The specification and claims have been amended to correct an obvious typographical error wherein “chamfered” has sometimes been misspelled as “chambered.”

Claims 1-5 have been amended responsive to the rejection under 35 U.S.C. § 112, which is believed to be moot.

The claims have been further amended to replace “annular elastic member” with “O-ring.” The basis for this is found at, e.g., page 3, line 18.

Claims 1-2 were rejected under 35 U.S.C. § 103 as being obvious over U.S. patent No. 6,280,095 (Furukoshi) in view of U.S. patent 5,826,681 (Kubo). It is respectfully submitted that the amended claims define over this prior art.

Furukoshi discloses a conventional roller bearing provided in a housing 1 having a bore 11 as a bearing supporting portion. The outer ring of the bearing is provided with a groove holding an O-ring which compensates for dimensional errors between the surface of the bore and the roller bearing, and prevents slippage due to vibration. In this case, both the O-ring and the groove are symmetric elements.

The present invention is based on the recognition of a problem associated with a bearing device having such an O-ring: upon attaching the bearing to the housing, the O-ring tends to be sandwiched between the opening edge of its groove and the housing, resulting in damage to the O-ring (paragraph bridging pages 1-2 of the present specification).

The present invention therefore provides an asymmetry for the groove housing the symmetric O-ring, i.e., a chamfered portion on one of the side faces of the groove -- the side face closer to the open end of the bearing support. This chamfer is asymmetric with respect to the chamfer on the other side face of the groove, e.g., it is larger so that the symmetric O-

ring can deform to fill the chamfer and will not become sandwiched between the opening edge of the groove and the housing. Claims 1 and 3 therefore now recite that a first chamfered portion is formed on one side face of the groove and a second chamfered portion is formed on the other side face of the groove, the first and second chamfered portions being asymmetric with each other.

There is no dispute that Furukoshi does not disclose that the groove holding the O-ring 23 exhibits side faces with first and second chamfered portions which are asymmetric with each other. Instead, the Office Action has relied on Kubo to provide teachings rendering it obvious for one skilled in the art to have so modified Furukoshi “for the purpose of providing a space which allows for movement of the components without deforming the location of the sealing ring relative to the two members being sealed.” This rejection is respectfully traversed, since one skilled in the art would not have found it obvious from Kubo to modify an O-ring seal.

Kubo is directed to a generally rectangular – but asymmetric -- piston seal provided in an asymmetric groove in a disk brake, the piston seal having the function of retracting the brake piston when brake fluid pressure is released. According to Kubo, a piston seal 1 not only provides sealing against leakage of the brake fluid in the cylinder 3, but also retracts the piston 4 when the brake pressure is released. For this purpose, the piston seal 1 is made generally rectangular, and a chamfer 6 having width W (Figure 2A) is provided in the groove for the piston seal 1. The piston seal 1 deforms to fill the chamfer 6 when the piston is advanced (Figure 2B), and springs back to its original shape when the fluid pressure is released to retract the piston 4 by the distance W (Figure 2C; column 1, lines 23-28). Since the piston seal 1 is made rectangular, its flat face can be surely gripped by the advancing piston 4 and will also surely grip the piston 4 to retract the same.

Thus, while Kubo provides a chamfer 6, it teaches that the purpose of the chamfer 6 is to define the distance W by which a rectangular piston seal 1 can “spring back” to retract the piston. This would only motivate one skilled in the art to provide such a chamfer for other applications in which a rectangular seal must similarly perform a spring back function to retract parts to their initial position.

For this reason, one skilled in the art would *not* have found it obvious to provide the asymmetric chamfer 6 of Kubo for the groove holding the *O-ring* of Furukoshi. Unlike the piston seal of Kubo which is rectangular to provide a contact surface with the bore 11 that can surely grip and move with the bore, the O-ring 23 of Furukoshi does not have a retraction function or a rectangular shape, and does not require a large chamfer to provide a space into which it will deform in order to retract the bearing. Therefore, the motivation taught in Kubo for providing the chamfer 6 would not be applicable to Furukoshi.

Nor would the motivation taught by the present application, i.e., to provide a space into which the O-ring can deform during insertion of the bearing, have been obvious since neither reference teaches the problem of an O-ring being damaged by the opening edge of the groove during insertion of the bearing into the housing.

Finally, the provision of an asymmetric chamfer for the O-ring groove in Furukoshi cannot be justified as being obvious as the predictable use of a known element in the art according to its established function, because the “established function” of the chamfer 6 of Kubo – to permit the seal to acquire energy for retracting the piston – as no application to the *non-retracting* O-ring of Furukoshi.

Applicants therefore respectfully submit that one skilled in the art would not have provided the O-ring groove of Furukoshi with an asymmetric chamfer arrangement, based merely upon the fact that an asymmetric chamfer has been known for permitting rectangular piston seals to have a retraction function.

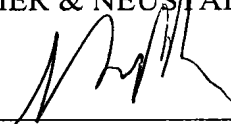
Claims 3-5 were rejected under 35 U.S.C. § 103 as being obvious over U.S. patent 5,247,855 (Alten) in view of Kubo. This rejection is similarly traversed.

Alten, like Furukoshi discloses a roller bearing mounted in a housing and using a symmetric seal element, but without the claimed asymmetric chamfer. As with Furukoshi, one skilled in the art would not have been motivated to provide Alten with the chamfer 6 of Kubo, which chamfer 6 is disclosed to have a brake retraction function. Similarly, one skilled in the art would not have been motivated to provide Alten with the chamfer 6 of Kubo to minimize damage to the seal member during the insertion of the bearing into the housing, since this problem is not taught in the prior art. Finally, as with Furukoshi, the proposed modification of Alten cannot be justified as the predictable use of a known component according to its established function, since the established function of the chamfer 6 of Kubo is the retraction of the piston, which is not applicable to the seal of Alten. The claims therefore also define over this prior art.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early Notice of Allowability.

Respectfully submitted,

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